

CLAIMS

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1. Process for manufacturing compounds based on one or more silicates of alkali metals such as Na, K and/or alkaline-earth metals such as Ca, Mg and/or rare earths such as Ce, optionally in the form of mixed silicates which combine at least two of these elements, by the conversion of silica and of halides or sulfates or nitrates, especially of one or more chlorides, of the said alkali metals and/or of the said rare earth and/or of the said alkaline-earth metals, such as NaCl, KCl or CeCl₄, **characterized in that** the heat necessary for this conversion is supplied, at least partly, by one or more submerged burners.

15. 2. Process according to Claim 1, **characterized in that** the submerged burner(s) is(are) fed with an oxidizer in the form of air, oxygen-enriched air or oxygen.

20. 3. Process according to either of the preceding claims, **characterized in that** the submerged burner(s) is(are) fed with a fuel in the form of natural gas, fuel oil or hydrogen and/or in that solid-type or liquid type fuel, especially fuel containing carbon materials based on polymers, possibly chlorinated polymers, or based on coal, is supplied near the said burner(s).

25. 4. Process according to one of the preceding claims, **characterized in that** the combustion created by the submerged burner(s) at least partly ensures stirring of the silica and of the halide(s).

30. 5. Process according to one of the preceding claims, **characterized in that** the combustion created by the submerged burner(s) at least partly generates the water needed for the conversion.

35. 6. Process according to one of the preceding claims, **characterized in that** the conversion also generates halogenated derivatives, especially utilizable chlorinated derivatives such as HCl or Cl₂ or H₂SO₄.

sbB 7. Process according to one of the preceding claims, **characterized in that** the silicate(s) formed is(are) treated in order to make it(them) compatible with use as one or more vitrifiable batch materials for 5 a glass furnace, the treatment comprising, in particular, a granulation step.

8. Process according to one of Claims 1 to 6, **characterized in that** the silicate(s) formed is(are) fed hot into a glass furnace.

10. 9. Apparatus for carrying out the process according to one of the preceding claims, **characterized in that** it comprises at least one reactor (1) equipped with one or more submerged burners (3) and at least one means for introducing silica and/or the halide(s) or 15 nitrates or sulfates and optionnaly liquid type or solid type combustibles, below the level of the materials undergoing melting, especially in the form of one or more feed-screw batch chargers (6).

10. Apparatus according to Claim 9, **characterized** 20 **in that** the walls (2, 4) of the reactor (1), especially those intended to be in contact with the various reactants/reaction products involved in the conversion, are provided with refractory materials, for example of the electrocast type or with refractory materials lined 25 with a metal lining of the titanium or zirconium type or are based on this type of metal, and are preferably combined, at least in the case of the side walls (4), with a cooling system using the circulation of fluid of the water type.

30. 11. Apparatus according to Claim 9 or Claim 10, **characterized in that** the walls of the reactor (1) define an approximately cubic, parallelepipedal or cylindrical cavity.

35. 12. Apparatus according to one of Claims 9 to 11, **characterized in that** the reactor (1) is equipped with means for treating the chlorinated effluents, especially means for recovering HCl or Cl₂ or H₂SO₄ or for neutralizing HCl and/or means for separating solid

particles, for example those based on a metal chloride, from the gaseous effluents.

13. Use of the process according to one of Claims 1
~~to 8 or of the apparatus according to one of Claims 9~~
5 ~~to 12~~ for preparing vitrifiable batch materials for the manufacture of glass.

14. Use of the process according to one of Claims 1
~~to 8 or of the apparatus according to one of Claims 9~~
~~to 12~~ for preparing raw materials, especially sodium silicate Na_2SiO_3 , for the manufacture of detergents.

10 15. Use of the process according to one of Claims 1
~~to 8 or of the apparatus according to one of Claims 9~~
~~to 12~~ for preparing raw materials, especially sodium silicate Na_2SiO_3 , for the manufacture of precipitated silica, more particularly from silica and sodium sulfate.

16. Use of the process according to any of claims 1
~~to 8 or of the apparatus according to any of claims 9~~
~~to 12~~ for the vitrification of wastes, notably of the 20 organo-chloride type, preferably by conversion of silica and of raw material carrying alkaline-earth metals at least.

17. Use of the process according to any of claims 1
~~to 8 or of the apparatus according to any of claims 9~~
25 ~~to 12~~ for the treatment of sand pollyted by fuel or similar hydrocarbonate compounds, preferably by conversion of silica and of raw material carrying alkaline-earth metals at least.

18. Process for obtaining glass containing silica 30 and alkali-metal oxides, of the Na_2O or K_2O type and/or alkaline-earth metal oxides of the CaO or MgO type and/or rare-earth oxides of the CeO_2 type, by melting vitrifiable materials in which the heat needed for the said melting comes at least partly from the submerged 35 burner(s), **characterized in that** the vitrifiable materials containing alkali metals, of the Na or K type, or rare earths, of the Ce type or alkaline-earth metals, are at least partly in the form of halides,

especially chlorides, of the said elements, such as
NaCl, KCl or CeCl_4 .

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